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Transistor - N-Channel, Logic Level, Enhancement Mode Field Effect

FDN337N

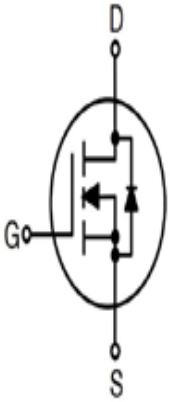
Features

- 2.2 A, 30 V
  - $R_{DS(on)}$ = 0.065 Ω @ V_{GS} = 4.5 V
  - $R_{DS(on)}$ = 0.082 Ω @ V_{GS} = 2.5 V
- Industry Standard Outline SOT−23 Surface Mount Package Using Proprietary SUPERSOT−3 Design for Superior Thermal and Electrical Capabilities
- High Density Cell Design for Extremely Low $R_{DS(on)}$
- Exceptional on−Resistance and Maximum DC Current Capability
- This Device is Pb−Free and Halogen Free

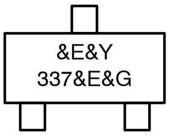


SOT-23

1 - Gate
2 - Source
3 - Drain



MARKING DIAGRAM



&E = Designates Space
&Y = Binary Calendar Year Coding Scheme
337 = Specific Device Code
&G = Date Code

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C unless otherwise noted.

Symbol	Parameter	Ratings	Unit
V_{DSS}	Drain−Source Voltage	30	V
V_{GSS}	Gate−Source Voltage − Continuous	±8	V
I_D	Drain/Output Current − Continuous	2.2	A
	Drain/Output Current − Pulsed	10	
P_D	Maximum Power Dissipation (Note 1a)	0.5	W
	Maximum Power Dissipation (Note 1b)	0.46	
T_J, T_{STG}	Operating and Storage Temperature Range	−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

T_A = 25°C unless otherwise noted.

Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Thermal Resistance, Junction−to−Ambient (Note 1a)	250	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction−to−Case (Note 1)	75	°C/W

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ELECTRICAL CHARACTERISTICS T_A = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain–Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	30	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	–	41	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V, V_{GS} = 0 V	–	–	1	μA
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 55°C	–	–	10	
I_{GSSF}	Gate–Body Leakage, Forward	V_{GS} = 8 V, V_{DS} = 0 V	–	–	100	nA
I_{GSSR}	Gate–Body Leakage, Reverse	V_{GS} = −8 V, V_{DS} = 0 V	–	–	−100	nA
ON CHARACTERISTICS (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	0.4	0.7	1	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	–	−2.3	–	mV/°C
$R_{DS(on)}$	Static Drain–Source On–Resistance	V_{GS} = 4.5 V, I_D = 2.2 A	–	0.054	0.065	Ω
		V_{GS} = 4.5 V, I_D = 2.2 A, T_J = 125°C	–	0.08	0.11	
		V_{GS} = 2.5 V, I_D = 2 A	–	0.07	0.082	
$I_{D(on)}$	On–State Drain Current	V_{GS} = 4.5 V, V_{DS} = 5 V	10	–	–	A
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 2.2 A	–	13	–	S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 10 V, V_{GS} = 0 V, f = 1.0 MHz	–	300	–	pF
C_{oss}	Output Capacitance		–	145	–	
C_{rss}	Reverse Transfer Capacitance		–	35	–	
SWITCHING CHARACTERISTICS (Note 2)						
$t_{d(on)}$	Turn–On Delay Time	V_{DD} = 5 V, I_D = 1 A, V_{GS} = 4.5 V, R_{GEN} = 6 Ω	–	4	10	ns
t_r	Turn–On Rise Time		–	10	18	
$t_{d(off)}$	Turn–Off Delay Time		–	17	28	
t_f	Turn–Off Fall Time		–	4	10	
Q_g	Total Gate Charge	V_{DS} = 10 V, I_D = 2.2 A, V_{GS} = 4.5 V	–	7	9	nC
Q_{gs}	Gate–Source Charge		–	1.1	–	
Q_{gd}	Gate–Drain Charge		–	1.9	–	
DRAIN–SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain–Source Diode Forward Current		–	–	0.42	A
V_{SD}	Drain–Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 0.42 A (Note 2)	–	0.65	1.2	V

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TYPICAL CHARACTERISTICS

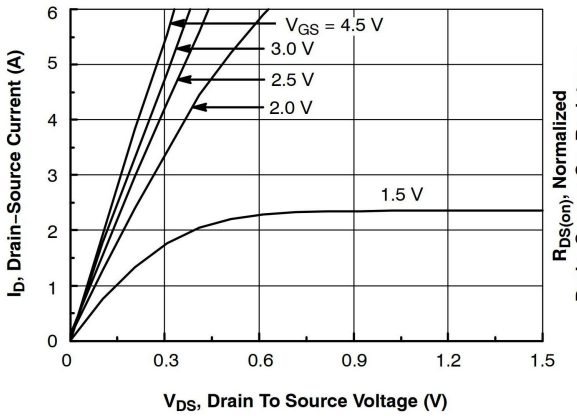


Figure 1. On–Region Characteristics

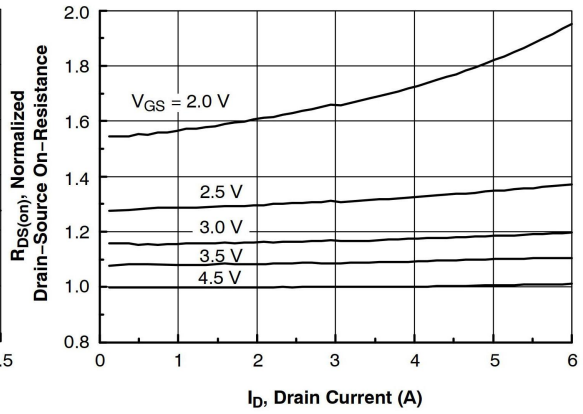


Figure 2. On–Resistance Variation with Drain Current and Gate Voltage

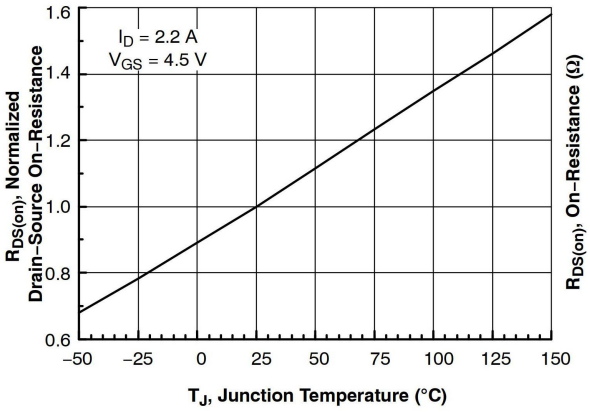


Figure 3. On–Resistance Variation with Temperature

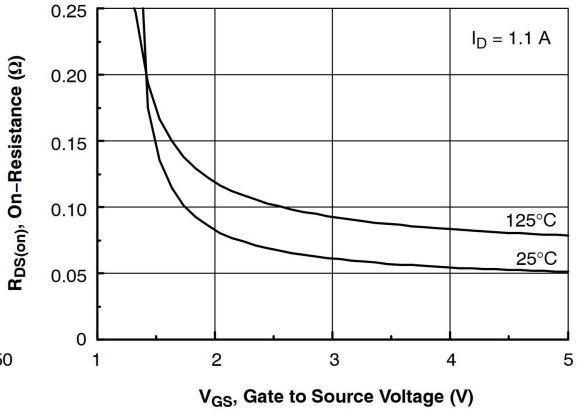


Figure 4. On–Resistance Variation with Gate–to–Source Voltage

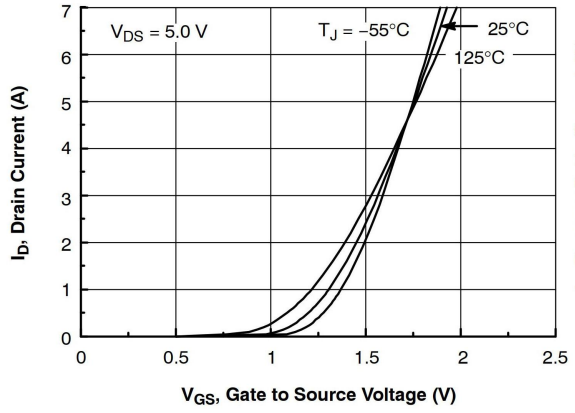


Figure 5. Transfer Characteristics

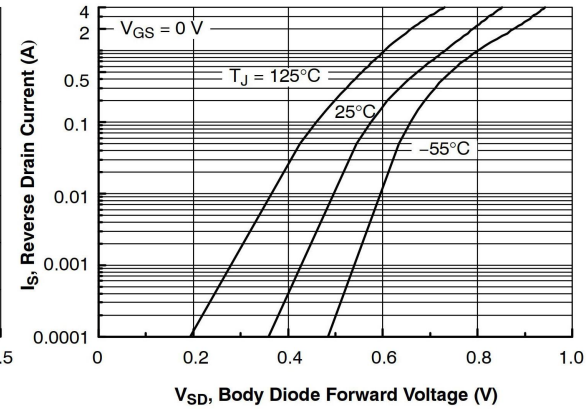


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

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TYPICAL CHARACTERISTICS (continued)

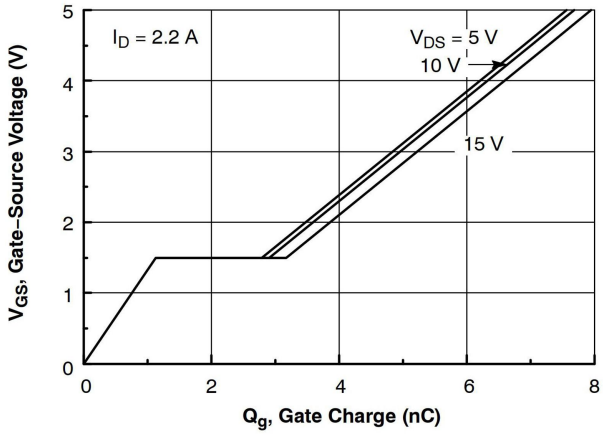


Figure 7. Gate Charge Characteristics

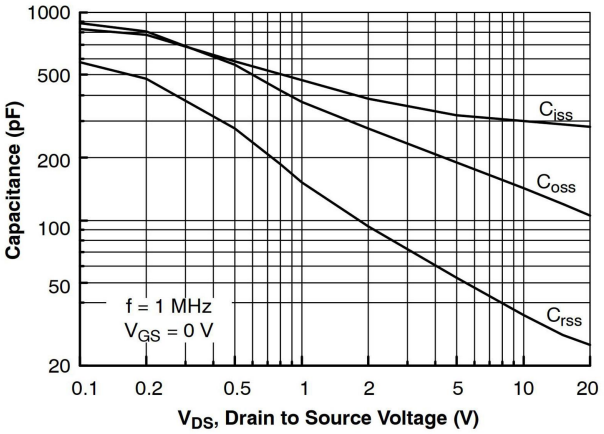


Figure 8. Capacitance Characteristics

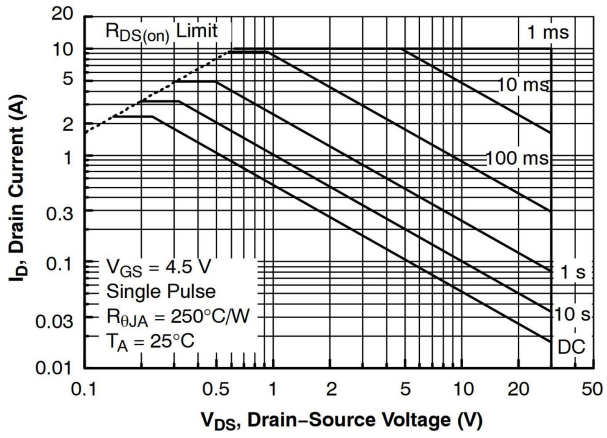


Figure 9. Maximum Safe Operating Area

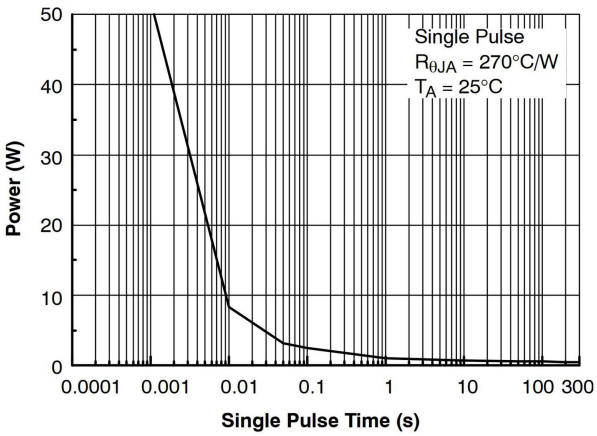
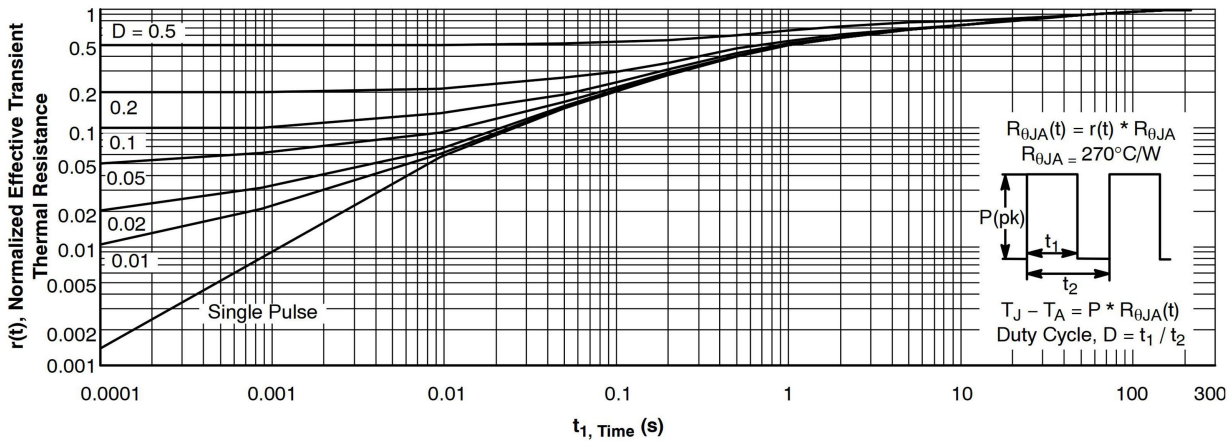


Figure 10. Single Pulse Maximum Power Dissipation

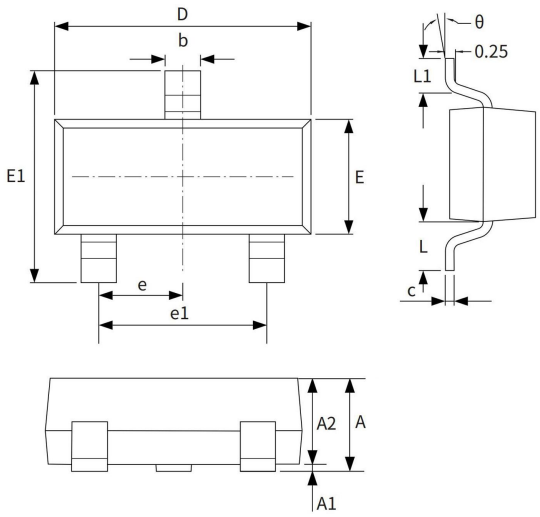


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Ordering Information

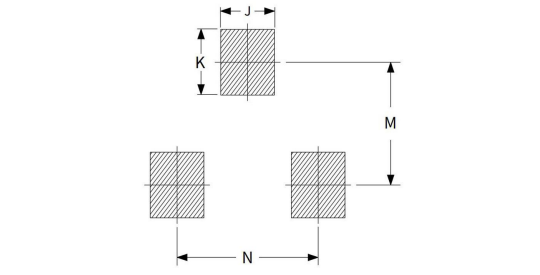
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-23	R1	0.008	3000	30000	240000	7''

Package Outline Dimensions (SOT-23)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.15	0.035	0.045
A1	-	0.10	-	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.80	2.00	0.071	0.079
L	0.550REF		0.022REF	
L1	0.30	0.50	0.012	0.020
θ	-	8°	-	8°

Suggested Pad Layout



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
J	0.75	0.85	0.030	0.033
K	0.85	0.95	0.033	0.037
M	1.95	2.05	0.077	0.081
N	1.85	1.95	0.073	0.077